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AUTOMATIC OPERATING ATTACHMENT FOR MANUALLY
OPERABLE INFLATING DEVICE
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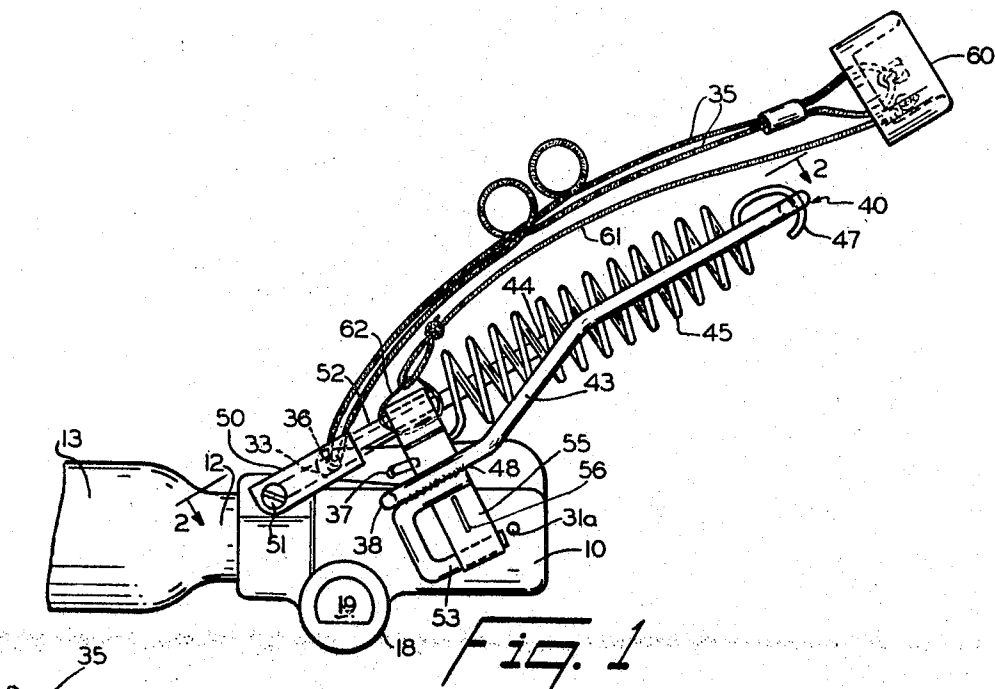


Fig. 1

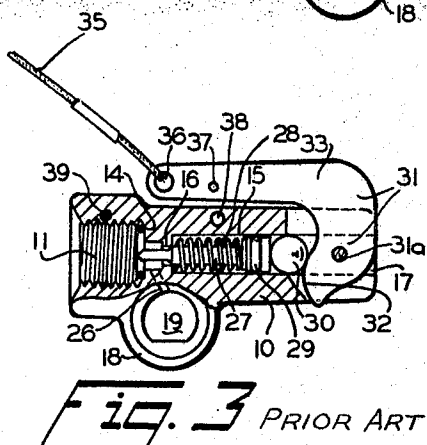


Fig. 3 PRIOR ART

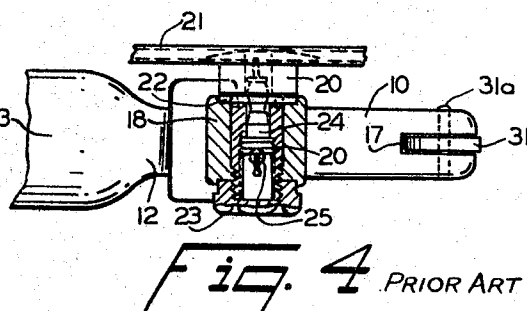


Fig. 4 PRIOR ART

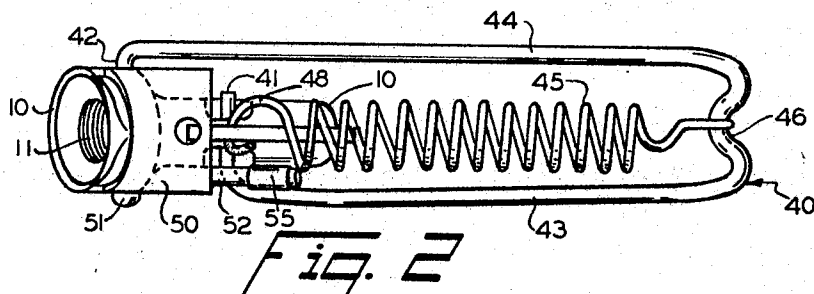


Fig. 2

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AUTOMATIC OPERATING ATTACHMENT FOR MANUALLY OPERABLE INFLATING DEVICE
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4 Claims

ABSTRACT OF THE DISCLOSURE

A head for a compressed gas container has a projecting arm swingable to one side for rupturing the container to inflate a flotation member. An attachment having a bent wire frame is secured to the head and a coil spring is tensioned between frame and arm for biasing the arm toward operating position. A swinging plate member pivotally secured to the head is secured against the spring biased arm by a paper ring encircling studs on the plate member and frame, respectively, to secure the arm until the ring is ruptured due to wetting.

BACKGROUND OF THE INVENTION

This invention relates to aquatic life saving devices having an inflatable flotation member and more particularly to an attachment for a manually operable device for puncturing a compressed gas container, the attachment automatically operating the puncturing device when it comes in contact with the water.

Like preservers for sailors, aviators and fishermen have long been provided in compact uninflated form so as to be carried in a pocket as safety equipment. The flotation member is of rubber or similar material and can be inflated by gas from a cartridge or other container of compressed gas. A relatively small head is secured in sealed relation with a relatively large gas container. The head is provided with a manually operable lever which, when operated, forces a pin against a frangible portion of the container releasing gas through the head and attached flotation member valve stem to the interior of the flotation member to inflate it.

This manually operable device is very reliable, small in size and, since it is safety equipment provided for the individual by large organizations, there are large numbers of the devices in use. Automatically operated devices which puncture the gas container on contact with the water are also known, but, due to the large supplies of manually operated devices on hand, there has long been a need for an economically manufactured attachment which can be easily secured to the manual devices in the field so that they will be automatically operated.

SUMMARY OF THE INVENTION

The invention contemplates a five part attachment including a coil spring for biasing the lever to operated position, and a latch or swinging member for holding the lever in its normal unoperated position. A frame is provided for anchoring one end of the spring and, since the head is small and the force to operate the lever requires a large spring, the frame necessarily projects from the head. Both the frame and the latch are secured to existing portions of the frame with a minimum of change by machining. A rupturable ring of paper extends between the frame and latch. The paper is strong enough when dry to hold the spring-biased lever in position but, when it becomes wet, the paper is ruptured and the lever is operated by the spring.

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BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a fragmentary side elevational view of the container rupturing device assembled with the automatically operating attachment according to the invention;

FIG. 2 is a plan view thereof as viewed in the direction of the arrows 2—2 in FIG. 1;

FIG. 3 is a side elevational view, partly in section, of the container rupturing device; and

FIG. 4 is a fragmentary bottom plan view, partly in section, of the device of FIG. 3 connected to a flotation member.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 3 and 4 show a well known manual device for rupturing the seal of a compressed gas container for inflating a flotation member.

A relatively small head 10 is threadedly engaged at 11 with the neck 12 of a cartridge or container 13 of gas under pressure. The end of neck 12 is frangible and is adapted to be engaged with an O-ring seal 14 in the head 10.

An axial passage 15 in head 10 has a restricted portion 16 opening into the threaded portion at 11 and extends the length of the head ending in an axial slot or notch 17 across the end of the head. A rounded pendant portion 18 of the head (FIG. 3) has a transverse hole 19 there-through adapted to receive the inlet valve stem 20 which is secured in the usual manner to the flexible flotation member 21, shown fragmentarily in FIG. 4. The ends of valve stem hole 19 are flat and a washer seal 22 at one end and a brass cap 23 threadedly secured to the valve stem at the other end seal the interior of the stem 20 in communication with the interior of the flotation member through the usual one way "Schroeder" type valve 24. A hole 25 through the valve stem communicates with the hole 19. The hole 19 communicates with passage 15 through two drilled holes 26, one of which is shown in FIG. 3.

The axial passage 15 carries a headed and pointed pin 27 for puncturing the frangible end of the neck 12 and a coil spring 28 around the pin extends between the head of the pin and the annular shoulder provided by the reduced portion of the passage at 16.

An O-ring seal 29 is carried in an annular groove in the head of pin 27 for sealing this end of passage 15. Also in passage 15 is a metal ball 30 bearing against the head of the pin 27.

A bent lever of the first class 31 is pivotally secured in the slot 17 of the head by a pin 31a. Lever 31 has a camming nose 32 at one end, for forcing ball 30 along the passage when the lever is operated, and a bent arm 33 at the other end of the lever extends out of the slot 17 and then curves to extend normally alongside the head 10.

A cord 35, secured to a hole 36 in the free end of arm 33, provides means for operating the arm and a second hole 37 through the lever is adjacent and spaced from a transverse hole 38 through head 10 so that the head may be secured against operation, for safety reasons, by looping a wire through holes 37 and 38.

Another transversely extending hole 39 through head 10 in the region of the threads at 11 and tangent to the threads has a fibrous plug therein which interferes with the threads of the container neck 12 for locking the container in the head.

Referring now to FIGS. 1 and 2, a bent heavy wire, U-shaped frame 40 has one inwardly bent end 41 received in the safety wire hole 38 of the head reamed out slightly large for this purpose. The other inwardly bent end 42 of the wire frame is received in one end of the reamed out hole 39 in the threaded region of the head.

The two opposed legs 43 and 44 extend on either side of a coil spring 45 forwardly of the head and at a small angle to the operating arm 33, extending to the transverse portion at the outer end of the frame. This transverse portion is bent to form a notch 46 over which one hooked end 47 of spring 45 is engaged. The other hooked end 48 of the spring is inserted through the safety wire hole 37 in the arm 33. Frame 40, with its inwardly bent ends 41 and 42 engaged in the longitudinally spaced holes 38 and 39, provides a remarkably stable support for the outer ends of the spring 45 and the spring, of course, biases the arm 33 toward its operated position.

To hold arm 33 in its normal unoperated position, a latch or swinging member 50 is provided pivotally secured to head 10 at either end of the container locking hole 39. The swinging member 50 is inverted U-shaped in cross-section as viewed in FIG. 1, comprising a flat plate with short bent down legs on either side. At one end of the member there are aligned holes through the legs so that the inward bent end 42 can pass through the hole in one leg before it engages the hole 39 in the head and a screw 51 passes through the hole in the other leg and is threadedly secured in the other end of hole 39 which is reamed and tapped for the purpose.

A post 52 is secured as by welding, to the underside of the flat plate portion of member 50, as viewed in FIG. 2, and the post extends forward of the plate. Another post 53, best seen in FIG. 1, is secured to the leg 43 of the frame, as by welding as shown, so as to be substantially parallel to and spaced from the post 52.

A continuous loop 55 of paper, which may be a strip with ends clipped together as at 56 as shown or glued together, is placed over the studs 52 and 53 for holding the member 50 against the free end of arm 33. The paper of loop 55 is made of a special paper material having a dry tensile strength of about four and one-half pounds per square inch which is ample for securing member 50 against the spring bias of arm 33 when spring 45 is at its small angle to the arm. The wet strength of the paper material, however, is low, less than one-third pound per square inch, so that when the loop 55 becomes wet, the spring-biased arm 33 acting on member 50 ruptures the loop.

Member 50 then swings away from the end of arm 33 and the heavy spring 45 pulls the arm to its operated position. As the lever 31 turns, its camming end 32 forces the ball 30 against the pin 27 which pierces the end of the container neck 12. When the end of the nose of cam 32 passes the ball, the ball is released and spring 28 withdraws pin 27 from the container.

The compressed gas flows from the contained into passage 15 and thence through holes 26 to the valve stem hole 19. The valve stem hole 25 is aligned with holes 26 and gas flows through the stem 20 past one-way valve 24 into the interior of the flotation member to inflate it.

The cord 35 for manually operating the head 10 may have a tab member 60 at its end and when the attachment 40-56 is secured to the head a shorter cord 61 may be secured at one end to tab 60 and at its other end to a fine wire or fiber loop 62 around one portion of the paper ring 55. When the tab 60 is pulled, therefore, the wire loop 62 cuts through the paper of ring 55 and the device with its attachment may thus be manually operated if desired.

As will be apparent to those familiar with the art, the invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The embodiment disclosed, therefore, is to be considered in all respects as illustrative rather than restrictive, the scope of the invention being indicated by the appended claims.

What is claimed is:

1. An attachment for a manually actuatable device for inflating a flotation member, the manual device comprising: a head and a container of gas under pressure in threaded and sealed engagement therewith, the container

having a frangible portion and the head having means operable by a lever for rupturing the frangible portion, the lever having an operating arm having a normal position alongside the head and manually oscillatable to an operated position projecting away from the head; the attachment comprising: a metal frame secured to the head, a spring having one end secured to the frame and its other end secured to the free end of the operating arm for biasing the arm toward its operated position, a swinging member oscillatably secured to the head and having a normal position secured against the operating arm for holding the arm in its normal position and operable to swing free of the arm, a first post projecting from the swinging member, a second post normally parallel and spaced from the first post projecting from the frame, and a rupturable ring around the two posts securing the swinging member in its normal position, the ring having at least a segmental portion of paper having a dry strength sufficient to hold the swinging member in its normal position and a wet strength sufficiently low as to allow the ring to be ruptured by the spring-biased arm when the paper becomes wet; whereby the combined manually actuatable device and attachment is automatically actuated when immersed in water.

2. The combined manual device and attachment defined in claim 1 having a manual pull-tab, the pull-tab being secured by a relatively long cord to the free end of the operating arm, a fine and strong filament loop around the paper portion of the rupturable ring, and a relatively short cord having one end secured to the tab and the other end secured to the filament loop, the loop being strong enough to cut the paper portion of the ring when the tab is pulled, whereby the combined device and attachment is also manually operable.

3. The combined manual device and attachment defined in claim 1, the frame member comprising a heavy wire bent into a narrow U-shape and having a first end inwardly bent and seated in a drilled hole in the side of the head adjacent its threaded engagement with the container, the wire frame having its other end inwardly bent and seated in another drilled hole in the side of the head forward of the first hole, the wire frame extending on either side of the spring at an angle to the operating arm from the inwardly bent ends to a connecting portion remote from the head, the connecting portion being bent to form a notch to which the outer end of the spring is secured, the swinging member comprising a U-shaped plate, the legs of the U having a pair of aligned holes therethrough, the first bent end of the wire passing through the hole in one leg, a screw passing through the hole in the other leg and seated in a drilled and threaded hole in the other side of the head, the first post projecting forward from the swinging member, the second post being offset from the frame, whereby the rupturable ring secures the swinging member against the free end of the operating arm.

4. An attachment for a manually actuatable device for inflating a flotation member, the manual device comprising: a compressed gas container and a smaller head in threaded and sealed engagement, the container having a frangible portion and the head having means operable by an arm for rupturing the frangible portion, the operating arm having a normal position alongside the head and being manually oscillatable to an operated position projecting forward of the head, the head having a transverse hole therethrough tangent to its threaded engagement with the container and a fibrous plug in the tangent hole for interfering with and locking the container threads in engagement, the arm and the head having respective adjacent holes therethrough forward of the tangent hole for passing a safety wire loop therethrough; the attachment comprising: a latch member having a flat plate portion and a short bent down leg at each side thereof, each leg having an aligned hole therethrough, a heavy wire frame bent into a substantially narrow, U-shaped configuration, one end of the wire being inwardly bent and passing through the hole

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in one latch leg and seated in one end of the plugged tangent hole, a screw passing through the hole in the other leg and threaded in the other end of the tangent hole, the other end of the wire being inwardly bent and seated in the safety wire hole of the head, the sides of the frame extending forwardly of the head at a small angle to the operating arm and terminating in a transverse frame end portion bent to form a notch, a coil spring extending between the frame sides and having one hooked end secured to the frame notch and its other hooked end secured in the safety wire hole in the operating arm for biasing the arm toward its operated position, the plate portion of the latch having a normal position secured against the free end of the normally positioned operating arm and operable to swing free of the arm, a first post fixed to and projecting forward of the plate portion of the latch, a second post fixed to the frame and normally parallel to and spaced from the first post, and a rupturable ring

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around the two posts securing the latch member in its normal position, the ring having at least a segmental portion of paper having dry strength sufficient to hold the latch member in its normal position and a wet strength sufficiently low as to allow the ring to be ruptured by the spring-biased arm when the paper becomes wet; whereby the combined manually actuatable device and its attachment is automatically actuated when immersed in water.

References Cited

UNITED STATES PATENTS

2,684,784 7/1954 Fox ----- 222—5

FOREIGN PATENTS

6,550 1894 Great Britain.

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